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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **A fastener for installing a sheet such as a lath spaced from a support.**

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DE-B-1 137 197
FR-A-2 109 805
FR-A-2 178 985
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Description

This invention relates to the attachment of a sheet such as an expanded metal lath to a support. In particular, the invention involves the use of a screw and spacing means to leave a space between the lath and the support.

At present a fastener for attaching a lath to a support comprises a screw having a shank with at least one thread on it, an enlarged head at one end of the shank and a tip at the other end, and spacing means for engaging the lath and holding it away from the support.

Current techniques for attaching a lath have been found to be quite unsatisfactory. Installers of lath frequently use scrap material as the spacing means or shim between the lath and the support, and then apply standard screws to hold the lath against the shim. With this technique, it is frequently the case that a workman will not provide a space between the lath and its support because scrap material may not be available, or because it may be difficult to hold a shim in place while installing a piece of lath of significant lateral extent. It should be noted that architects and building codes usually require that a space be provided between the lath and a support. The spacing is important because it provides a place for plaster to extrude when it is applied to the lath to form a key. Without proper spacing at locations where the lath is supported, the thickness of the plaster will not be sufficient, and unsightly cracking is much more likely to occur.

US-A-1701095 discloses a spacer used in connecting a metal lath to a support. The spacer comprises a generally helically shaped member having a central through bore, a lower portion with abutment means to prevent penetration of the spacer into the support, and an outer portion forming a tapering helix with a larger end and a smaller end. The smaller end is adapted initially to engage an opening in the lath whereby movement of the spacer causes it to pass through the lath and occupy a space between the lath and on the support.

FR-A-2178985 discloses a fastener for attaching a sheet to a support comprising a screw having a shank with a thread on it, an enlarged head at one end of the shank and a tip at the other end, and spacing means for engaging the member and holding it away from the support, the spacing means including a helical portion having a pitch and a diameter, each of which is greater than the pitch and diameter of the thread on the shank.

According to this invention a fastener as disclosed in FR-A-2178985 is characterised in that the sheet is a metal lath, the pitch and diameter of the helical portion are at least twice the pitch and diameter respectively of the thread and the spacing means comprises a helical coil which has a lower portion nearer the tip at least one helical turn of which mates with the thread on the shank of the screw, and an upper portion of larger diameter which forms the helical portion, the lower portion enabling the coil to be preassembled with the screw and located initially adjacent the tip of the screw.

A fastener in accordance with this invention will now be described with reference to the accompanying drawings; in which:-

Figure 1 is a perspective view of a first example of fastener;

Figure 2 is a side elevation of the first example after installation;

Figure 3 is a side elevation of the tip of the first example;

Figure 4 is a side elevation part of a second example;

Figure 5 is a perspective view of the second example after installation;

Figure 6 is a perspective view of a nosepiece; and,

Figure 7 is a side elevation of the nosepiece in use.

Referring now to the drawings in which the same numerals are used for similar parts throughout the various figures, Figures 1, 2 and 3 show a screw 10 with a head 12 and a drill tip 14. A spacing element 16 is preassembled to the screw 10 at a location on the shank of the screw adjacent the tip 14. The spacing element 16 includes an enlarged upper portion 18 and a smaller lower portion 20. The lower portion 20 is preferably at least in partial engagement with threads 22 on the screw 10. The spacing element 16 is comprised of a coil made from round wire. The lower end 24 includes a sharp edge 26 which is adapted to engage a metal support 28.

Figure 2 shows the fastener of the present invention in an installed position. Lath 30 is held away from the metal support 28. The drill tip 14 of the screw 10 is adapted to form a hole in the support 28. During the several revolutions required to form the hole in the support, the spacing element 16 threadingly engages and penetrates the lath 30. The edge 26 of the lower end 24 of the spacing element 16 engages the metal support 28 and prevents the penetration of the spacing element 16 into the support 28. When the screw 10 begins to penetrate and threadingly advance through the support 28, engagement between the edge 26 and the support 28 causes the spacing element to stop its rotation. Continued axial advancement of the screw 10 through the spacing element 16 and the support 28 eventually causes the lath 30 to be clamped between the spacing element 16 and the head 12 of the screw.

It should be noted that in the preferred embodiment, the spacing element is in moderately tight engagement with the lower portion of the screw. This moderately tight or gripping engagement allows rotation of the head 12 of the screw to be transferred to the spacing element 16 as drilling takes place. Once drilling is completed and threaded engagement between the threads 22 and the support 28 begins to take place, abutment between the end 24 of the spacing element 16 and the support 28 causes a slight release of the gripping action between the spacing element and

the screw. The release of the engagement between the spacing element 16 and the screw 10 allows the axial advancement of the screw through the spacing element 16 and into the support 28. The sharp edge 26 is specifically adapted to engage a metallic support 28.

Figures 4 and 5 show a slightly modified version of the preferred embodiment. The embodiment of Figures 4 and 5 is specifically adapted for use with wall construction in which a non-metallic surface member 49, such as drywall or particle board, has been previously attached to a metal support 48. Figure 4 shows a coil spacing element 36 with an enlarged upper portion 38 and a smaller lower portion 40. The lower end 44 of the spacing element 36 is slightly enlarged and bent to provide a blunt abutment 46. By providing a blunt abutment 46 at the lower end of the spacing element 36, penetration of the spacing element into the member 49 is prevented. The operation of the fastener shown in Figures 4 and 5 is similar to that shown in Figures 1 through 3. The spacing element 36 is firmly preassembled to the lower threaded portion of a screw 10. As the tip 14 of the screw 10 is placed against the member 49 and rotated, the helical spacing element 36 threadingly engages the lath 30. The abutment 46 at the lower end of the spacing element 36 prevents the penetration of the spacing element into the member 49. The spacing element 36 is thereby lodged between the lath and the support. The screw 10 axially advances through the spacing element 36, through the member 49 and through the support 48, and the lath 30 is clamped between the upper portion 38 of the spacing element 36 and the head 12 of the screw 10.

In the preferred embodiment of the present invention, shown in Figures 1 through 5, it should be noted that the coil spacing element is generally in the form of a tapering helix. The number of turns at the lower portion of the spacing element may be varied. It is desirable, however, that the spacing element be capable of preassembly with a screw. The number of turns of the coil which are in registration with the threads of the screw, as well as the height and lateral extent of the enlarged upper portion of the spacing element will depend upon the type of lath being fastened. Smaller gauge lath may require that the expanded upper portion of the spacing element extend to a point near the lower portion of the spacing element in order to assure threading engagement between the spacing element and the lath. Similarly, the lateral size of the upper portion of the spacing element will depend upon the size of the openings in the lath. The lateral size of the spacing element is preferably at least as large if not larger than the openings 31 in the lath 30. This is necessary to ensure that the lath will be held by the spacing element away from the support.

Figures 6 and 7 show a nosepiece designed to cooperate with the above described embodiments of the present invention. The nosepiece 80 is comprised of a threaded collar 81 adapted to threadingly engage a driving tool 90. The nosepiece also includes two telescoping tubular elements 83 and 84. A coil spring 85 within the upper tubular element 83 urges the lower element 84 into an extended position. Prongs 86 are rigidly fixed to the free end of the lower element 84. The prongs 86 are adapted to penetrate openings 31 in the lath 30 and abut the support 48. A torque transmitting bit 91 associated with the tool 90 engages a recess in the head 12 of the screw 10. As the screw is advanced through the spacing element 36 and into the support 48, the tubular elements 83 and 84 telescopically collapse. The telescoping movement of the elements 83 and 84 is limited, however, so that axial movement of the bit 91 is limited. At a predetermined axial position, the screw 10 will disengage from the bit 91 and further rotation of the screw will stop. The prongs 86 and the lower element 84 therefore define a torque-limiting recess 87 which prevents the application of excessive compressive force upon the spacing element 36. By limiting the axial movement of the bit 91, and therefore the head 12, the lath 30 is maintained at a predetermined distance from the support 48.

It is clear that alternative methods of limiting the axial penetration of the screw 10 are available. Examples include forming a shoulder on the shank of the screw at a predetermined distance from the head to prevent penetration of the screw into the support.

Claims

1. A fastener for attaching a sheet (30) to a support (28) comprising a screw (10) having a shank with a thread (22) on it, an enlarged head (12) at one end of the shank and a tip (14) at the other end, and spacing means (16) for engaging the member (30) and holding it away from the support (28) the spacing means (16) including a helical portion (18) having a pitch and a diameter, each of which is greater than the pitch and diameter of the thread (22) on the shank, characterised in that the sheet is a metal lath, the pitch and diameter of the helical portion (18) are at least twice the pitch and diameter respectively of the thread (22) and the spacing means comprises a helical coil (16) which has a lower portion (20) nearer the tip (14) at least one helical turn of which mates with the thread (22) on the shank of the screw (10), and an upper portion of larger diameter which forms the helical portion, the lower portion (20) enabling the coil (16) to be preassembled with the screw (10) and located initially adjacent the tip (14) of the screw (10).

2. A fastener according to claim 1, in which the lower portion (20) is firmly mounted on the shank so that rotation of the screw causes the coil (16) to rotate and pass through the sheet (30), but engagement of the support (28) by the coil member (16) stops further rotation of the coil (16) and subsequent rotation of the screw (10) causes the screw (10) to pass through the coil (16) and clamp the sheet (30) between the head (12) of the

screw (10) and the upper portion (18) of the coil (16).

3. A fastener according to claim 1 or claim 2, wherein the tip (14) is formed as a drill.

4. A fastener according to any one of claims 1 to 3, wherein the lower portion (20) of the coil (16) has a sharp leading edge (26) which digs into the support (28) to prevent rotation of the coil (16).

5. A fastener according to any one of claims 1 to 4, wherein the lower portion (20) of the coil (16) includes means (44) to prevent penetration of the coil (6) into a non-metallic support (49).

6. A fastener according to claim 5, wherein the means (44) comprises a continuation of the coil (16) which extends laterally outwards and has a radial extent substantially larger than that of the at least one turn which engages the thread (22) of the screw (10).

Patentansprüche

1. Befestiger zum Anbringen einer Platte (30) auf einem Träger (28) mit einer Schraube (10), die einen Schaft mit einem darauf befindlichen Gewinde (22) aufweist, sowie einen vergrößerten Kopf (12) an einem Ende des Schaftes und eine Spitze (14) an dem anderen Ende, und einen Abstandshalter (16) zum Zusammenwirken mit dem Teil (30) und Beabstanden vom Träger (28), wobei der Abstandshalter (16) einen schraubenförmigen Abschnitt (18) mit einer Steigung und einem Durchmesser aufweist, von denen jeder größer ist als die Steigung und der Durchmesser des Gewindes (22) auf dem Schaft, dadurch gekennzeichnet, daß die Platte ein metallischer Putzhalter ist, die Steigung und der Durchmesser des schraubenförmigen Abschnitts (18) mindestens zweimal die Steigung bzw. den Durchmesser des Gewindes (22) aufweisen und der Abstandshalter eine schraubenförmige Spule (16) aufweist, die einen unteren Abschnitt (20) näher zur Spitze (14) aufweist, wobei mindestens eine Schraubenwindung davon auf das Gewinde (22) auf dem Schaft der Schraube (10) paßt, und einen oberen Abschnitt größeren Durchmessers, der den schraubenförmigen Abschnitt bildet, wobei der untere Abschnitt (20) ermöglicht, daß die Spule (16) mit der Schraube (10) vormontiert wird und anfänglich nahe der Spitze (14) der Schraube (10) angeordnet ist.

2. Befestiger nach Anspruch 1, dadurch gekennzeichnet, daß der untere Abschnitt (20) fest auf dem Schaft angebracht ist, so daß eine Drehung der Schraube die Spule (16) dreht und durch die Platte (30) hindurchführt, jedoch ein Zusammenwirken des Trägers (28) mit der Spule (16) ein weiteres Drehen der Spule (16) beendet und anschließendes Drehen der Schraube (10) diese durch die Spule (16) hindurchführt und die Platte (30) zwischen dem Kopf (12) der Schraube (10) und dem oberen Abschnitt (18) der Wicklung (16) einklemmt.

3. Befestiger nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Spitze (14) als Bohrer ausgebildet ist.

4. Befestiger nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß der untere Abschnitt (20) der Spule (16) eine scharfe Führungskante (26) aufweist, die sich in den Träger (28) eingräbt, um eine Drehung der Spule (16) zu verhindern.

5. Befestiger nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß der untere Abschnitt (20) der Spule (16) Mittel (44) aufweist, um ein Eindringen der Spule (16) in einen nichtmetallischen Träger (49) zu verhindern.

6. Befestiger nach Anspruch 5, dadurch gekennzeichnet, daß die Mittel (44) eine Fortführung der Spule (16) aufweisen, die sich seitlich nach außen strecken und eine radiale Ausdehnung haben, die wesentlich größer als die der mindestens einen Windung ist, die mit dem Gewinde (22) auf der Schraube (10) im Eingriff steht.

Revendications

1. Attache pour fixer une feuille (30) sur un support (28), comprenant une vis (10) ayant une tige portant un filet (22), une tête élargie (12) à une extrémité de la tige et une pointe (14) à l'autre extrémité, et des moyens d'écartement (16) destinés à s'enclencher avec l'élément (30) et à le maintenir éloigné du support (28), les moyens d'écartement (16) comprenant une partie hélicoïdale (18) ayant un pas et un diamètre qui sont chacun supérieurs au pas et au diamètre du filet (22) de la tige, caractérisée en ce que la feuille est un treillis métallique, le pas et le diamètre de la partie hélicoïdale (18) sont au moins doubles du pas et du diamètre, respectivement, du filet (22) et les moyens d'écartement comprennent un enroulement hélicoïdal (16) qui comporte une partie inférieure (20) rapprochée de la pointe (14), dont au moins une spire hélicoïdale s'accouple avec le filet (22) situé sur la tige de la vis (10), et une partie supérieure de plus grand diamètre qui forme la partie hélicoïdale, la partie inférieure (20) permettant à l'enroulement (16) d'être pré-assemblé avec la vis (10) et positionné initialement à proximité immédiate de la pointe (14) de la vis (10).

2. Attache selon la revendication 1, dans laquelle la partie inférieure (20) est montée fermement sur la tige de manière qu'une rotation de la vis amène l'enroulement (16) à tourner et à passer à travers la feuille (30), mais l'entrée en prise de l'élément enroulé (16) avec le support (28) arrête la poursuite de la rotation de l'enroulement (16) et la rotation, ensuite, de la vis (10) amène la vis (10) à passer à travers l'enroulement (16) et à brider la feuille (30) entre la tête (12) de la vis (10) et la partie supérieure (18) de l'enroulement (16).

3. Attache selon la revendication 1 ou la revendication 2, dans laquelle la pointe (14) est réalisée sous la forme d'une mèche de perçage.

4. Attache selon l'une quelconque des revendications 1 à 3, dans laquelle la partie inférieure (20) de l'enroulement (16) présente une arête menante vive (26) qui pénètre dans le support (28) pour empêcher la rotation de l'enroulement (16).

5. Attache selon l'une quelconque des revendications 1 à 4, dans laquelle la partie inférieure (20) de l'enroulement (16) comprend des moyens (44) destinés à empêcher la pénétration de l'enroulement (16) dans un support non métallique (49).

6. Attache selon la revendication 5, dans laquelle les moyens (44) comprennent un prolongement de l'enroulement (16) qui s'étend latéralement vers l'extérieur et qui présente une étendue radiale sensiblement plus grande que celle de la ou des spires qui entrent en prise avec le filet (22) de la vis (10).

FIG. 1

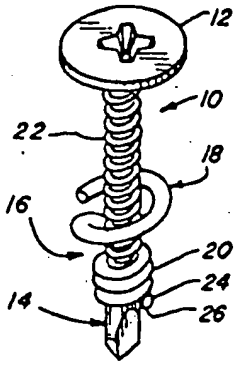

FIG. 2

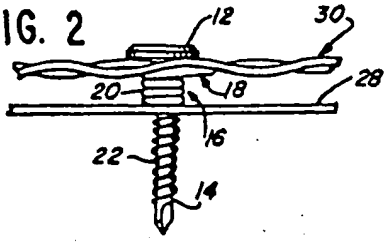

FIG. 3

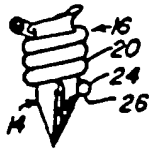

FIG. 4

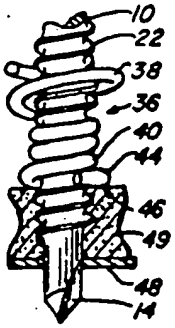

FIG. 5

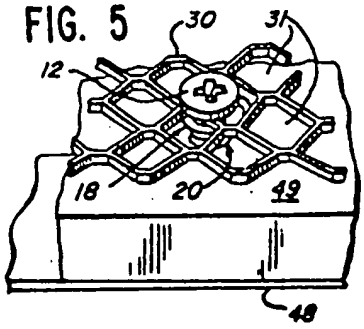

FIG. 6

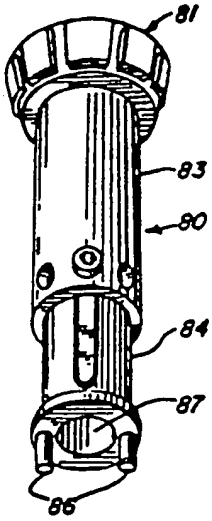

FIG. 7